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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/597,705	06/16/2000	Jeffrey J. Gold	PD-990259	3463

20991 7590 08/28/2003

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EXAMINER	
STEVENS, THOMAS H	

ART UNIT	PAPER NUMBER
2123	4

DATE MAILED: 08/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

4

Office Action Summary	Application No.	Applicant(s)	
	09/597,705	GOLD ET AL.	
	Examiner	Art Unit	
	Thomas H. Stevens	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 June 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *6/16/00* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claims 1-21 have been submitted for examination.

2. Claims 1-21 have been examined and rejected.

Application Objections

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, figures one and two must show the following feature(s):

Claims 1,5: The following limitations were missing from both figures

-emulated spacecraft; control processor,

-first simulation engine; attitude control,

Claim 2: Neither figure discloses host computer,

Claims 3,4: Attitude control subsystem term missing from both figures,

Claim 7: Clarification is required regarding GPS generator and GPS server in relation to the figures,

Claim 8: No mention of central time source, first simulation engine and the central time count in either figure,

Claims 9,10: Question as to which time parameter for which clock in figure 2,

Claim 12: No mention of second simulation engine in figure 1,

Claim 16: Neither figure discloses adjusting real-time clock,

Claim 18: Neither figure discloses steps to filter the counter counts,

Claim 20: Neither figure discloses a slaving the Master Counter,

Claim 21: Neither figure discloses a time stepping date.

-Page 10, line 9 discloses figure 2 as having a compute engine comprising of simulation engines 12 and 13; however, simulation 13 is missing from figure 2.

-Page 10, line 12 discloses a GPS Server 50 and a Master Counter; but it's not disclosed in figure 2.

-Page 8, line 10 discloses the ESCP 40 as an integral part of the AD RTS system. Based on the rest of the specification, are the AD RTS and the AD RTS 11 one of the same?

-Page 8, line 21-22 discloses a local clock 42 as derived from the real-time clock; and is the satellite local calendar time that is telemetered to the ground status and control system. Figure 2 doesn't display nor describe a satellite local calendar time.

No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 15 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

6. Claim 15 recites, "...providing an emulated spacecraft control processor which "emulates a memory" for the embedded processor...". The phrase "emulates a memory" is not disclosed in the specifications; nor does the examiner understand what applicant is attempting to convey.

7. Claim 20 recites, "...the step of slaving the master counter count and the compute engine..." This function is not taught in the specifications. Further, no teaching to the prior art or incorporating references remedies this deficiency.

Claim Rejections - 35 USC § 102

8. The Examiner has applied prior art using best efforts to decipher Applicant's invention in view of the previously written essay. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8a. Claims 1-21 are rejected under U.S.C. 102(b) as being anticipated by Zammit (1997).

Regarding claim 1

As to claim 1, Zammit teaches a case history of hardware-in-the-loop air-to-ground simulation for their HS601 geosynchronous communications satellite. The HS601 is the attitude determination and control subsystem (ADCS), which comprises of sensors, control actuators, and microprocessor hardware and software; all required to control vehicle attitude during all phases of the mission. The ADCS supports antenna deployment, soar wing positioning, autonomous spacecraft management and failure detection and response functions that allow the spacecraft to maintain service with minimal ground control activity. One major component part includes the redundant spacecraft control processors (SCP).

This processor is part to the ADCS development process by which the SCP breadboard hardware supports the mixed simulation test (MST).

The MST system is capable of operating with either breadboard or flight SCP units to simulate all mission phases, such as hardware and software; to generate all ADCS commands and process all SCP generated telemetry; all interfacing for command telemetry, sensors, actuators, thrusters, and power designated to emulate the spacecraft interfaces; access to all signal I/O for SCP and internal software variables and constants at Zammit: pg. 443, column 1, 3rd paragraph; pg. 444-445, columns 2 and 1 respectively.

Claim 1: *A spacecraft emulation system comprising: a central time source generating a time reference; an emulated spacecraft control processor which contains an embedded processor that provides an emulated input/output interface to communicate simulated spacecraft data, wherein the embedded processor processes the simulated spacecraft data, and contains a real time clock having a real-time clock period; a first simulation engine that processes attitude control system data from the emulated spacecraft control processor to simulate an attitude control system of the spacecraft in real-time, the first simulation engine operative to produce sensor data for input to the emulated spacecraft control processor based on the simulated system dynamics and adjusts the real time clock period in response and time reference: pg.12, lines1-13.*

Regarding claim 2

As to claim 2, Zammit teaches an HP workstation for all software development as well as a window environment for operating a simulator. The workstation uses the Dynamic Satellite Simulator (DSS), which emulates the complete satellite command path through the uplink, satellite response, telemetry down link, as well as anomaly conditions: pg. 443, column 2, 7th paragraph; pg. 446 column 2, paragraph 10.

***Claim 2**: The system as recited in claim 1 further comprising a host computer, which provides the command data and receives the telemetry data and time data from the emulated spacecraft control processor: pg 12, lines 1-3.*

Regarding claim 3

As to claim 3, the spacecraft emulation system as recited in claim 1, Zammit teaches a three-bay rack of special purpose test equipment containing SCP interface panels, telemetry and sensor simulators etc. All parts of the MST configuration which includes the ADCS sensor and actuator redundancy and has the capability of operating two SCP units simultaneously. The inputs to the SCP interface panels are controlled through the computer interface panel either statistically using the HP 9000-400 computer or with manual input or dynamically. It's inherent that the emulation of hardware of the ADCS has interface peripherals to accommodate internal/external devices. Whether specified units are co-located or not is immaterial.

Claim 3: *The system of claim 1, wherein the attitude control system data is communicated via a VMEbus: pg.12, 1-2.*

Regarding claim 4

As to claim 4, the attitude control system data traveled via VMEbus as recited in claim 3, Zammit discloses telemetry data being dispersed to and from the host computer: pg 445, column 2, paragraphs 4 &5.

Claim 4: *The system of claim 3, further comprising a VME bus interface manager, which communicates the command data, the telemetry data and time between the VMEbus and the host computer: pg.12, 1-3.*

Regarding claim 5

As to claim 5, the first emulation system as recited in claim 1, Zammit teaches the physical location of the MST and its ancillary devices: pg 445, column 1, paragraphs 1-15. However, it's inherent for equipment to be in close proximity to one anther.

Claim 5:*The system of claim 1, wherein the first simulation engine and the emulated spacecraft control processor are housed in a single housing: pg.12, 1-3.*

Regarding claim 6

As to claim 6, the first emulation system as recited in claim 1, Zammit discloses the real-simulation process: pg. 444, column 2, paragraphs 5-7.

Claim 6: *The system as recited in claim 1 herein said the first simulation engine processes attitude control system data from the emulated spacecraft control processor to simulate an attitude control system of the spacecraft in real-time: pg.13, 1-4.*

Regarding claim 7

As to claim 7, the first emulation system as recited in claim 1., Zammit teaches using a synchronizer to manage the two telemetry streams: pg. 444, column 2, paragraph 1. Although Zammit does not disclose a GPS generator per se; however, it's inherently obvious to one skilled in the art to use a reference clock to synchronize another.

Claim 7*: The system as recited in claim 1 wherein the central time source comprises a GPS generator: pg. 7, lines1-2.*

Regarding claim 8

As to claim 8, Zammit teaches a case history of hardware-in-the-loop air-to-ground simulation for their HS601 geosynchronous communications satellite. The HS601 is the attitude determination and control subsystem (ADCS), which comprises of sensors, control actuators, and microprocessor hardware and software; all required to control vehicle attitude during all phases of the mission. The ADCS supports antenna deployment, soar wing positioning, autonomous spacecraft management and failure detection and response functions that allow the spacecraft to maintain service with minimal ground control activity One major component part includes the redundant

spacecraft control processors (SCP). This processor is part to the ADCS development process by which the SCP breadboard hardware supports the mixed simulation test (MST). The MST system is capable of operating with either breadboard or flight SCP units to simulate all mission phases, such as hardware and software; to generate all ADCS commands and process all SCP generated telemetry; all interfacing for command telemetry, sensors, actuators, thrusters, and power designated to emulate the spacecraft interfaces; access to all signal I/O for SCP and internal software variables and constants at Zammit: pg. 443, column 1, 3rd paragraph; pg. 444-445, columns 2 and 1 respectively.

***Claim 8**: A spacecraft simulation system housed in a single housing comprising: a central time source generating a time reference; an emulated spacecraft control processor, which contains an embedded processor that provides an emulated input/output interface to communicate simulated spacecraft data, wherein the embedded processor processes the simulated spacecraft data and contains a master counter; a first simulation engine coupled to the time central time source and the emulated spacecraft control processor, the first simulation engine operative to produce data for input to the emulated spacecraft control processor based on the simulated system dynamic, and adjusts a time parameter of a real time clock period in response to said master counter and said central time: pg. 13, lines1-13.*

Regarding claims 9 & 10

As to claim 9, the spacecraft simulation system housed in a single housing unit as recited in claim 8, Zammit teaches the two telemetry streams—short and dwell. : pg. 444, column 2, first paragraph.

Claim 9*: The system of claim 8, wherein the time parameter comprises short-term bias: pg.13, line 1-2.*

Claim 10*: The system of claim 8, wherein the time parameter comprises long term drift: pg.13, line 1-2.*

Regarding claim 13

As to claim 13, wherein the time parameter comprises long-term drift, Zammit teaches how the GSMST system expands the basic MST simulate the remaining portions of the spacecraft: electrical, thermal control; propulsion; and telemetry etc: pg. 445,column 1, MST Configuration and Functional Description section.

Claim 13: *The system of claim 10, wherein the power, thermal, propulsion and payload subsystem data includes simulated thermal command data, power command, propulsion command data, and payload command data: pg. 14, lines 1-3.*

Regarding claim 11

As to claim 11, the spacecraft simulation system housed in a single housing unit as recited in claim 8, Zammit teaches the first simulation test based on the ADCS development process: pg. 444-445 section II.

Claim 11*: The system as recited in claim 8 wherein said the first simulation engine processes attitude control system data from the emulated spacecraft control processor to simulate an attitude control system of the spacecraft in real-time: pg 11, lines 1-2.*

Regarding claim 12

As to claim 12, the spacecraft simulation system housed in a single housing unit as recited in claim 8, Zammit teaches encompassing the ADCS development process and the Ground Station Mixed Simulation Test System (GSMTS). The GSMTS does incorporate simulation, among other thing, telemetry and thruster commands, emanating from the HP workstation: pg. 445-446, section II.

Claim 12*: The system as recited in claim 8 further comprising a second simulation engine which processes power, thermal, propulsion and payload subsystem data from the emulated spacecraft control processor or ground computer to simulate power, thermal propulsion and payload subsystems of the spacecraft in real-time, the second simulation engine operative to produce data from the power, thermal, propulsion and payload subsystems for input to the emulated spacecraft control processor or ground computer based on the simulated system dynamics: pg 11, lines 1-8.*

Regarding claim 14

As to claim 14, the spacecraft simulation system housed in a single housing unit as recited in claim 8, Zammit teaches using a synchronizer to manage the two telemetry streams: pg. 444, column 2, paragraph 1.

Although Zammit does not disclose a GPS generator per se; however, it's inherently obvious to one skilled in the art to use a reference clock to synchronize another.

***Claim 14**: The system as recited in claim 8 wherein the central time source comprises a GPS generator: pg., line 1-2.*

Regarding claim 19

As to claim 19, the spacecraft simulation system housed in a single housing unit as recited in claim 8, Zammit teaches using the ADCD sensor and the actuator redundancy: pg. 445, column 2, paragraph 2.

***Claim 19**: The method of claim 8 further comprising the step of modifying a time frame of the compute engine: pg.15, line 1-2.*

Regarding claim 16

As to claim 16, wherein the central time source comprises a GPS generator recited in claim 14, Zammit teaches using the HP 9000-400 to send changing to pulse widths and pulse phasing etc: pg 445, column 2, paragraph 5.

Claim 16: A method as recited in claim 14 further comprising the step of adjusting a real time clock in the simulated spacecraft control processor to compensate for the short-term bias and long-term drift: pg. 16, lines 1-3.

Regarding claim 17

As to claim 17, wherein the central time source comprises a GPS generator recited in claim 14, Zammit teaches using a synchronizer to manage the two telemetry streams: pg. 444, column 2, paragraph 1. Although Zammit does not disclose a GPS generator per se; however, it's inherently obvious to one skilled in the art to use a reference clock to synchronize another.

***Claim 17**: A method as recited in 14 claim further comprising the step of adjusting a local time clock in the simulated spacecraft control processor to compensate for the short-term bias and long-term drift: pg. 15, line1-3.*

Regarding claim 18

As to claim 18, wherein the central time source comprises a GPS generator recited in claim 14, Zammit teaches running a program in either a open or closed loop process. This point infers the notion of this cyclic/non-cyclic operation for filtering (e.g., phase-lock loop): pg.445, column 1, paragraph 7.

***Claim 18**: The method of claim 14 wherein the step of determining comprises the step of filtering the counter count and the compute engine: pg., line 1-2.*

Regarding claim 19

As to claim 19, wherein the central time source comprises a GPS generator recited in claim 14, its inherently obvious to those skilled in the art that if a pulsed signal is modified in phase, it's modified in time.

Claim 19: The method of claim 8 further comprising the step of modifying a time frame of the compute engine: pg. 15, 1-2.

Regarding claim 21

As to claim 21, wherein the central time source comprises a GPS generator recited in claim 14, its assumed that Zammit teaches the process of time stamping is executed within the telemetry list manager: pg. 444, column 1, paragraph 6.

Claim 21*:The method of claim 14 further comprising the step of time stamping data from the simulation engine with the central time: pg. 15, lines 1-2.*

Correspondence Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Stevens whose telephone number is (703) 305-0365, Monday-Friday (8:00 am- 4:30 pm) or contact Supervisor Mr. Kevin Teska at (703) 305-9704.

10. Any inquire of general nature or relating to the status of this application should be directed to the Group receptionist whose phone number is (703) 305-3900.

THS
August 11, 2003